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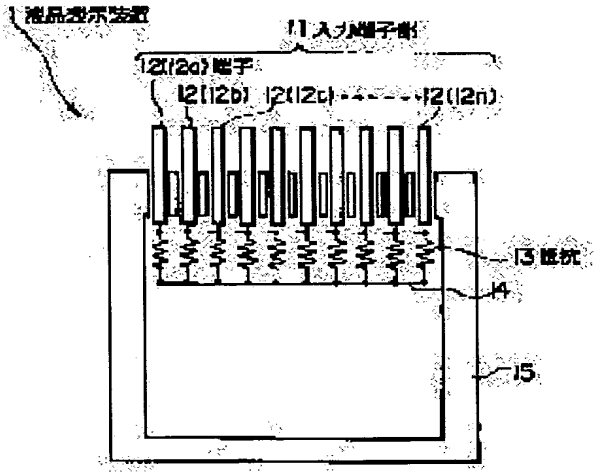
(54) LIQUID CRYSTAL DISPLAY DEVICE, SUBSTRATE OF LIQUID CRYSTAL DISPLAY DEVICE AND METHOD FOR DIVIDING THIS SUBSTRATE

(57)Abstract:

PURPOSE: To make it possible to protect elements against the static electricity generated from respective terminals and to assure static electricity resistance even in the state that the elements are formed as a liquid crystal display panel by connecting the respective terminals of input terminal parts to each other by resistors having specific resistance values.

CONSTITUTION: The input element parts 11 of this liquid crystal display device 1 are composed of the plural terminals (for example, (n) pieces) 12. The resistors 13 having the resistance values within a range of 0.5 to 5MΩ are connected between the respective terminals 12. The resistors 13 consist of, for example, polycrystalline silicon. Wiring electrodes 14 are connected via the resistors 13 to the respective terminals 12. The respective terminals 12 of the input terminal parts 11 are connected by the resistors 13 having the resistance value of 0.5 to 5MΩ in such a manner, by which the elements, such as thin-film transistors(TFTs), are protected against the static electricity generated at the respective terminals 12. Since the resistance value of the resistors 13 is as high as 0.5 to 5MΩ, substantially an open state is attained even if a potential difference is applied to the respective terminals 12 and the driving of the liquid crystal display panel in the state of maintaining the static electricity resistance is possible even if the elements are formed as the liquid crystal panel.



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CLAIMS

[Claim(s)]
[Claim 1] The liquid crystal display characterized by preparing the resistance which connects between each terminal of said input terminal section, and has the resistance within the limits of 0.5 M omega - 5 M omega in the liquid crystal display with which the input terminal section was equipped with two or more terminals.
[Claim 2] The substrate of the liquid crystal display characterized by preparing the resistance which connects between each terminal of the input terminal section of each liquid crystal display formed in a substrate in the substrate of the liquid crystal display with which two or more liquid crystal displays are formed in one substrate, and has the resistance within the limits of 0.5 M omega - 5 M omega.
[Claim 3] The circumference polar zone of one liquid crystal display and this one liquid crystal display which are formed in a substrate in the substrate of the liquid crystal display with which two or more liquid crystal displays are formed in one substrate are the substrate of the liquid crystal display characterized by preparing the conductive pattern which connects the circumference polar zone of another liquid crystal display.
[Claim 4] Each terminal of the input terminal section of one liquid crystal display and this one liquid crystal display which are formed in a substrate in the substrate of the liquid crystal display with which two or more liquid crystal displays are formed in one substrate are the substrate of the liquid crystal display characterized by connecting the circumference polar zone of another liquid crystal display.
[Claim 5] It is the substrate of the liquid crystal display characterized by preparing the conductive pattern which connects the circumference polar zone of liquid crystal display with another circumference polar zone of said one liquid crystal display and this one liquid crystal display in the substrate of a liquid crystal display according to claim 2.
[Claim 6] It is the substrate of the liquid crystal display characterized by connecting the circumference polar zone of liquid crystal display with another each terminal of the input terminal section of said one liquid crystal display and this one liquid crystal display in the substrate of a liquid crystal display according to claim 2.
[Claim 7] It is the substrate of the liquid crystal display characterized by connecting the circumference polar zone of liquid crystal display with another each terminal of the input terminal section of said one liquid crystal display and this one liquid crystal display in the substrate of a liquid crystal display according to claim 3.
[Claim 8] It is the substrate of the liquid crystal display characterized by connecting the circumference polar zone of liquid crystal display with another each terminal of the input terminal section of said one liquid crystal display and this one liquid crystal display in the substrate of a liquid crystal display according to claim 5.
[Claim 9] It is the division approach of the substrate of the liquid crystal display characterized by dividing this substrate after cutting the conductive pattern which connects the circumference polar zone of liquid crystal display with another circumference polar zone of after rubbing processing and one liquid crystal display and this one liquid crystal display in the division approach of a substrate that two or more liquid crystal displays are formed in one substrate and conducting electric inspection of each

liquid crystal display after that.
[Claim 10] It is the division approach of the substrate of the liquid crystal display characterized by being the division approach of the substrate of a liquid crystal display that two or more liquid crystal displays are formed in one substrate, and dividing a substrate after cutting each terminal of the part which connects the circumference polar zone of liquid crystal display with another each terminal of the input terminal section of after rubbing processing and each liquid crystal display and liquid crystal display which has this input terminal section, or its near and conducting electric inspection of each liquid crystal display after that.
[Claim 11] In the division approach of the substrate of a liquid crystal display according to claim 9 After rubbing processing, While cutting the conductive pattern which connects the circumference polar zone of liquid crystal display with another circumference polar zone of one liquid crystal display and this one liquid crystal display Each terminal of the part which connects the circumference polar zone of liquid crystal display with another each terminal of the input terminal section of each liquid crystal display and liquid crystal display which has this input terminal section, or its near is cut. The division approach of the substrate of the liquid crystal display characterized by dividing a substrate after conducting electric inspection of each liquid crystal display after that.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the substrate of a liquid crystal display and a liquid crystal display, and the division approach of the substrate.
[0002]
[Description of the Prior Art] As a cure against static electricity which can be set like the erector of a liquid crystal display, terminals were short-circuited by a certain approach. It was connecting between ** terminal which connects between ** terminal which connects between ** terminal which short-circuits ** terminals directly by the transistor or the non-line type resistance element on a conductive tape and which connects between ** terminal by the pattern which consists of amorphous silicon, irradiates ultraviolet rays at the part, and prevents electrification through capacity as the approach etc. For example, the gate electrode and the signal line were short-circuited by the pattern of the amorphous silicon of the above-mentioned **. Thus, since the terminal and the terminal were short-circuited directly, electric inspection was conducted after dividing the substrate with which a liquid crystal display is formed.
[0003]
[Problem(s) to be Solved by the Invention] In what short-circuited terminals by the conductive pattern

as mentioned above, after dividing the substrate, unless it came out, electric inspection was not able to be conducted. Moreover, in some which short-circuited terminals on the conductive tape, the process which sticks a conductive tape increased and the technical problem that a component was destroyed by static electricity at the time of moreover removing a conductive tape occurred.

[0004] This invention aims at offering the substrate of the liquid crystal display excellent in the static electricity resistance, and a liquid crystal display, and the division approach of the substrate.

[0005]

[Means for Solving the Problem] This inventions are the substrate of the liquid crystal display made in order to attain the above-mentioned object, and a liquid crystal display, and the division approach of the substrate.

[0006] A liquid crystal display is the thing equipped with the resistance which connects between each terminal of the input terminal section, and the resistance has the resistance within the limits of 0.5 M omega - 5 M omega.

[0007] It is the thing equipped with the resistance to which the liquid crystal display of plurality [substrate / of a liquid crystal display / substrate / one] is formed in, and between each terminal of the input terminal section of each liquid crystal display is connected, and the resistance has the resistance within the limits of 0.5 M omega - 5 M omega.

[0008] Two or more liquid crystal displays are formed in one substrate, and the substrate of a liquid crystal display prepares the conductive pattern which connects the circumference polar zone of liquid crystal display with another circumference polar zone of a liquid crystal display and this liquid crystal display.

[0009] Two or more liquid crystal displays are formed in one substrate, and the substrate of a liquid crystal display connects the circumference polar zone of liquid crystal display with another each terminal of the input terminal section of each liquid crystal display and liquid crystal display which has this input terminal section.

[0010] After rubbing processing, the division approach of a substrate cuts the conductive pattern which connected the circumference polar zone of liquid crystal display with another circumference polar zone of the liquid crystal display formed in the substrate and this liquid crystal display, and after it conducts electric inspection of each liquid crystal display after that, it divides a substrate.

[0011] The division approach of a substrate cuts each terminal of the part which connects the circumference polar zone of liquid crystal display with another each terminal of the input terminal section of each liquid crystal display formed in the substrate and liquid crystal display which has this input terminal section, or its near after rubbing processing, and after it conducts electric inspection of each liquid crystal display after that, it divides a substrate.

[0012]

[Function] In the above-mentioned liquid crystal display, since between each terminal of the input terminal section was connected by the resistance which has the resistance within the limits of 0.5 M omega - 5 M omega, the component of a liquid crystal display is protected from static electricity generated for each terminal. Moreover, since the resistance of the above-mentioned resistance is as high as 0.5 M omega - 5 M omega, even if it gives the potential difference between each terminal, it will almost be in an opening-condition. Therefore, it can drive, maintaining the static electricity resistance also in the condition of having become a liquid crystal display panel. Moreover, when the resistance of the above-mentioned resistance is set up lower than 0.5 M omega, it will be influenced of the terminal except inspecting, in case it inspects by giving an end child the potential difference. On the other hand, since it becomes almost equivalent to the condition of not connecting between terminals at all when resistance is set up more highly than 5 M omega, there is no protective effect over static electricity. Therefore, the resistance of resistance is set up within the limits of 0.5 M omega - 5 M omega as mentioned above.

[0013] In the substrate of the above-mentioned liquid crystal display, since between each terminal of

the input terminal section of each liquid crystal display was connected by the resistance which has the resistance within the limits of 0.5 M omega - 5 M omega, a component is protected from static electricity generated for each terminal. Moreover, even if it gives the potential difference to each terminal, it will almost be in an opening-condition. Therefore, electric inspection of a liquid crystal display is attained in the condition of having formed in the substrate. Moreover, the resistance of the above-mentioned resistance is set up within the limits of 0.5 M omega - 5 M omega for the same reason as the case of the liquid crystal display explained previously.

[0014] In the substrate of the above-mentioned liquid crystal display, two or more liquid crystal displays are formed in one substrate, and since the conductive pattern which connects the circumference polar zone of liquid crystal display with another circumference polar zone of one liquid crystal display and this liquid crystal display was prepared, the circumference polar zone of one liquid crystal display will be shared with the circumference polar zone of other liquid crystal displays. Therefore, since the capacity of the circumference polar zone of one liquid crystal display becomes large substantially, the static electricity resistance becomes high.

[0015] In the substrate of the above-mentioned liquid crystal display, two or more liquid crystal displays are formed in one substrate, and since the circumference polar zone of liquid crystal display with another each terminal of the input terminal section of each liquid crystal display and liquid crystal display which has this input terminal section was connected, before cutting each liquid crystal display on a panel, each terminal of each liquid crystal display is maintained at this potential. Therefore, the static electricity resistance becomes high.

[0016] By the division approach of the above-mentioned substrate, since the conductive pattern which connected the circumference polar zone of liquid crystal display with another circumference polar zone of the liquid crystal display formed in the substrate after rubbing processing and this liquid crystal display is cut and the circumference polar zone is connected to other circumference polar zone at the time of rubbing processing, the capacity of the circumference polar zone becomes large. Therefore, the static electricity resistance at the time of rubbing processing becomes high. Subsequently, since electric inspection of each liquid crystal display is conducted after cutting a conductive pattern, electric inspection can be conducted, without being influenced [which connected the circumference polar zone and other circumference polar zone].

[0017] Moreover, by the division approach of the above-mentioned substrate, since each terminal of the part which connects the circumference polar zone of liquid crystal display with another each terminal of the input terminal section of each liquid crystal display formed in the substrate after rubbing processing and liquid crystal display which has this input terminal section, or its near is cut, each terminal is maintained at this potential at the time of rubbing processing. Therefore, the static electricity resistance at the time of rubbing processing becomes high. Subsequently, since electric inspection of each liquid crystal display is conducted after cutting each terminal of the above-mentioned part which makes connection, or its near, electric inspection can be conducted, without being influenced [which connected each terminal and the circumference polar zone].

[0018]

[Example] The important section block diagram of drawing 1 R> 1 explains the example concerning the liquid crystal display of this invention.

[0019] As shown in drawing 1 , the input terminal section 11 is constituted by the liquid crystal display 1 with the terminal 12 of plurality (for example, n pieces). Between each above-mentioned terminal 12, the resistance 13 which has the resistance within the limits of 0.5 M omega - 5 M omega is connected. This resistance 13 consists of polycrystalline silicon. Moreover, the wiring electrode 14 is connected to each terminal 12 through the above-mentioned resistance 13. In addition, the drawing also showed the circumference polar zone 15 prepared in the side periphery of the above-mentioned liquid crystal display 1.

[0020] In the above-mentioned liquid crystal display 1, since between each terminal 12 of the input

terminal section 11 was connected by the resistance 13 which has the resistance within the limits of 0.5 M omega – 5 M omega, components (graphic display abbreviation), such as a thin film transistor (TFT [say / TFT] is [the following and] the abbreviation for Thin Film Transistor), are protected from static electricity generated for each terminal 12. Moreover, since the resistance of the above-mentioned resistance 13 is as high as 0.5 M omega – 5 M omega, even if it gives the potential difference to each terminal 12, it will almost be in an opening-condition. Therefore, it can drive, maintaining the static electricity resistance also in the condition of having become a liquid crystal display panel.

[0021] Moreover, when the resistance of the above-mentioned resistance 13 is set up lower than 0.5 M omega, in case it inspects by giving the end child 12 (for example, 12a) the potential difference, it will be influenced of terminals 12 (for example, 12b, 12c, ..., 12n) other than the end child 12a. On the other hand, since it becomes almost equivalent to the condition of not connecting between terminals 12 at all when resistance is set up more highly than 5 M omega, there is no protective effect over static electricity. Therefore, the resistance of resistance 13 is set up within the limits of 0.5 M omega – 5 M omega as mentioned above.

[0022] Next, the important section block diagram of drawing 2 explains the substrate of the liquid crystal display with which two or more liquid crystal displays are formed in one substrate. By a diagram, the substrate (henceforth a substrate) 2 of the liquid crystal display with which the liquid crystal display 1 (1A, 1B, 1C, 1D) is formed is shown. Moreover, the same sign is given to a component part the same with having been shown in above-mentioned drawing 1 .

[0023] As shown in drawing 2 , between each terminal 12 of each input terminal section 11 of each liquid crystal display 1 (1A, 1B, 1C, 1D) currently formed in the substrate 2, the resistance 13 which has the resistance within the limits of 0.5 M omega – 5 M omega is formed. It represented by a diagram and liquid crystal display 1A showed. Therefore, it has the same composition as liquid crystal display 1A also about liquid crystal displays 1B–1D. Moreover, the circumference polar zone 15 is formed on the above-mentioned substrate 2 of the side periphery of each above-mentioned liquid crystal display 1. In addition, although above-mentioned drawing 2 showed the substrate 2 which formed four liquid crystal displays 1 as an example, the number of a liquid crystal display 1 is not limited to four pieces.

[0024] In the substrate 2 explained by above-mentioned drawing 2 , since between each terminal 12 of one liquid crystal display 1 was connected by the resistance 13 which has the resistance within the limits of 0.5 M omega – 5 M omega, a component is protected from static electricity generated for each terminal 12. Moreover, even if it gives the potential difference to each terminal 12, it will almost be in an opening-condition. Therefore, electric inspection of a liquid crystal display 1 is attained in the condition of having formed in the substrate 2. Moreover, the resistance of the above-mentioned resistance 13 is set up within the limits of 0.5 M omega – 5 M omega for the same reason as the case of the liquid crystal display 1 explained by drawing 1 .

[0025] Next, the important section block diagram of drawing 3 explains the substrate of the liquid crystal display with which two or more liquid crystal displays are formed in one substrate. By a diagram, the substrate (henceforth a substrate) 2 of the liquid crystal display with which the liquid crystal display 1 (1A, 1B, 1C, 1D) is formed is shown. Moreover, the same sign is given to a component part the same with having been shown in above-mentioned drawing 2 .

[0026] As shown in drawing 3 , the circumference polar zone 15 (15B) of another liquid crystal display 1 (1B) is connected for the circumference polar zone 15 (15A) of each liquid crystal display 1 (1A) currently formed in the substrate 2, and this liquid crystal display 1A by the conductive pattern 16 (16A).

[0027] Similarly, each circumference polar zone 15 is connected with the circumference polar zone 15 arranged around it by the conductive pattern 16. That is, the circumference polar zone 15 (15C) and the circumference polar zone 15 (15D) are connected by the conductive pattern 16 (16B), and conductive pattern 16A and conductive pattern 16B are connected by conductive pattern 16C. Therefore, each circumference polar zone 15 is mutually connected by the conductive pattern 16 (16A, 16B, 16C). Similarly, the conductive pattern 16 connects also with the circumference polar zone (graphic display

abbreviation) of another liquid crystal display currently formed near the circumference polar zone 15 of each liquid crystal display 1. In addition, although above-mentioned drawing 3 showed the substrate 2 in which four liquid crystal displays 1 were formed, the number of a liquid crystal display 1 is not limited to four pieces.

[0028] In the substrate 2 explained by above-mentioned drawing 3 , two or more liquid crystal displays 1A-1D are formed in one substrate 2. From having formed the conductive patterns 16A-16C which connect the circumference polar zone 15B-15D of another liquid crystal displays 1B-1D, circumference polar-zone 15A and this liquid crystal display 1A of 1 liquid-crystal-display 1A For example, circumference polar-zone 15of 1 liquid-crystal-display 1A A will be shared with the circumference polar zone 15B-15D of other liquid crystal displays 1B-1D. Therefore, since the capacity of circumference polar-zone 15A of 1 liquid-crystal-display 1A becomes large substantially, the static electricity resistance becomes high. The static electricity resistance at the time of the rubbing processing especially in the manufacture process of a liquid crystal display becomes high.

[0029] Next, the important section block diagram of drawing 4 explains the substrate of the liquid crystal display with which two or more liquid crystal displays are formed in one substrate. By a diagram, the substrate (henceforth a substrate) 2 of the liquid crystal display with which the liquid crystal display 1 (1A, 1B, 1C, 1D) is formed is shown. Moreover, the same sign is given to a component part the same with having been shown in above-mentioned drawing 2 .

[0030] As shown in drawing 4 , liquid crystal displays 1A-1D are formed in the substrate 2. And the circumference polar zone 15 (15A) of liquid crystal display 1A with another each terminal 12 (12C) and this liquid crystal display 1C of the input terminal section 11 (11C) of liquid crystal display 1C is connected. Moreover, the circumference polar zone 15 (15B) of liquid crystal display 1B with another each terminal 12 (12D) and this liquid crystal display 1D of the input terminal section 11 (11D) of liquid crystal display 1D is connected. Thus, the circumference polar zone 15 of liquid crystal display 1 with another each terminal 12 of the input terminal section 11 of each liquid crystal display 1 and this is connected. In addition, although above-mentioned drawing 4 showed the substrate 2 in which four liquid crystal displays 1 were formed, the number of a liquid crystal display 1 is not limited to four pieces.

[0031] In the substrate 2 explained by above-mentioned drawing 4 , two or more liquid crystal displays 1 are formed in one substrate 2, and since the circumference polar zone 15 of liquid crystal display 1 (for example, liquid crystal display 1A) with another each terminal 12 of one liquid crystal display 1 (for example, liquid crystal display 1C) and this was connected, before cutting each liquid crystal display 1 on a panel, each terminal 12 of each liquid crystal display 1 is maintained at this potential. Therefore, the static electricity resistance becomes high.

[0032] Moreover, it is also possible to constitute combining the structure explained by above-mentioned drawing 2 and drawing 3 . That is, as shown in drawing 5 , the resistance 13 which has the resistance within the limits of 0.5 M omega - 5 M omega is formed between each terminal 12 of each input terminal section 11 of each liquid crystal display 1 currently formed in the substrate 2. Moreover, circumference polar-zone 15 comrades prepared in the side periphery of each above-mentioned liquid crystal display 1 are connected by the conductive pattern 16.

[0033] Furthermore, it is also possible to constitute combining the structure explained by above-mentioned drawing 2 and drawing 4 . That is, as shown in drawing 6 , the resistance 13 which has the resistance within the limits of 0.5 M omega - 5 M omega is formed between each terminal 12 of each input terminal section 11 of each liquid crystal display 1 currently formed in the substrate 2. Moreover, each terminal 12 of a liquid crystal display 1 and this connect the circumference polar zone 15 of another liquid crystal display 1.

[0034] It is also possible to constitute further again combining the structure explained by above-mentioned drawing 3 and drawing 4 . That is, as shown in drawing 7 , circumference polar-zone 15 comrades prepared in the side periphery of each liquid crystal display 1 currently formed in the substrate 2 are connected by the conductive pattern 16. The circumference polar zone 15 of liquid

crystal display 1 with still more nearly another each terminal 12 of the input terminal section 11 of each liquid crystal display 1 and this liquid crystal display 1 is connected.
[0035] Furthermore, it is also possible to constitute combining the structure explained by above-mentioned drawing 2 , drawing 3 , and drawing 4 . That is, as shown in drawing 8 , the resistance 13 which has the resistance within the limits of 0.5 M omega - 5 M omega is formed between each terminal 12 of each input terminal section 11 of each liquid crystal display 1 currently formed in the substrate 2. Moreover, circumference polar-zone 15 comrades prepared in the side periphery of each above-mentioned liquid crystal display 1 are connected by the conductive pattern 16. The circumference polar zone 15 of liquid crystal display 1 with still more nearly another each terminal 12 of the input terminal section 11 of each liquid crystal display 1 and this liquid crystal display 1 is connected.
[0036] Next, production process drawing of the flow chart of the TFT substrate of drawing 9 and the TFT substrate of drawing 10 explains the formation approach of the terminal 12 and resistance 13 which gave [above-mentioned] explanation. I would like you to double and refer to drawing 9 and drawing 10 in the following explanation. In addition, here explains the case where it forms as an example using the manufacture process of TFT.
[0037] The "channel stratification" is performed first. That is, as shown in (1) of drawing 10 , it is called CVD below chemical vapor growth [among membrane formation techniques. By the] method which is abbreviation which is Chemical Vapour Deposition, CVD deposits the polycrystalline silicon layer 31 for forming a channel layer on a substrate (here, for example, a quartz substrate being used) 2. Then, the impurity which gives conductivity to the above-mentioned polycrystalline silicon layer 31 is poured in with ion-implantation as a doping technique. Furthermore, an annealing process is performed and the impurity injected into the above-mentioned polycrystalline silicon layer 31 is activated.
[0038] As shown in (2) of drawing 10 after that, with a lithography technique (a lithography technique says hereafter the process which forms a resist mask with resist spreading, exposure, development, baking, etc.), and an etching technique, patterning of the above-mentioned polycrystalline silicon layer (31) is carried out, and the channel field 32 is formed. Moreover, the resistance 13 which will connect each terminal and each wiring electrode in the above-mentioned polycrystalline silicon layer (31) is simultaneously formed by the above-mentioned patterning. With it, while constitutes auxiliary capacity and an electrode (graphic display abbreviation) also forms it simultaneously by the above-mentioned patterning. The above-mentioned resistance 13 passes through a next ion-implantation process, and is n+. By considering as a layer, resistance is controlled within the limits of 0.5 M omega - 5 M omega (for example, about 1 M omega).
[0039] Then, the wet processing with ashing or exfoliation liquid removes the resist mask (graphic display abbreviation) formed with the above-mentioned lithography technique. In the following processes, the resist mask formed with the lithography technique shall be removed in front of heat treatment processes (for example, a diffusion process, annealing, etc.) or a membrane formation process.
[0040] Next, "gate-dielectric-film formation" is performed. As shown in (3) of drawing 10 , gate dielectric film 33 (part shown according to a two-dot chain line) is formed with the oxidizing [thermally] method or a CVD method. Both silicon oxide, and both [either or] are used for gate dielectric film 33. "Gate electrode formation" is performed continuously. For example, a polycrystalline silicon layer is deposited with a CVD method, with a lithography technique and an etching technique, patterning of this polycrystalline silicon layer is carried out, and the gate electrode 34 is formed. At this time, patterning also of the electrode (graphic display abbreviation) of another side which constitutes auxiliary capacity (graphic display abbreviation) is carried out simultaneously.
[0041] Patterning of the gate dielectric film 33 is continuously carried out with a lithography technique and an etching technique. And with ion-implantation, an impurity is poured into the field used as a pixel transistor, and a source drain field (graphic display abbreviation) is formed in it. Moreover, with ion-implantation, an impurity is poured into each and a source drain field (graphic display abbreviation) is formed also in the field (graphic display abbreviation) used as an n channel transistor and a p channel

transistor.
[0042] "Interlayer insulation film formation" is performed after that. At this process, as shown in (4) of drawing 10 , an interlayer insulation film 35 is deposited with a CVD method. The impurity previously poured in by annealing after that is diffused. Then, "contact hole formation" is performed. At this process, a contact hole is formed in an interlayer insulation film 35 with a lithography technique and an etching technique. This is for connecting each terminal (henceforth an input terminal electrode) of a source electrode, a drain, a signal-line electrode, and the input terminal section, a wiring electrode, etc., and showed the contact hole 38 for wiring electrodes linked to the contact hole 36 for signal lines linked to the channel field 32, the contact hole 37 for the input terminal electrodes linked to resistance 13, and resistance 13 with the drawing.
[0043] Next, "wiring electrode formation" is performed. For example, a wiring layer is deposited by sputtering. As this wiring layer, it forms with the ingredient used for the usual wiring of aluminum, an aluminum system metal, a refractory metal, etc., for example. Then, a source electrode (graphic display abbreviation), a drain electrode (graphic display abbreviation), the signal-line electrode 39, the input terminal electrode 40 (equivalent to said terminal 12), and wiring electrode 14 grade are formed by the above-mentioned wiring layer with a lithography technique and an etching technique. Since the circumference polar zone (graphic display abbreviation) is also formed at this time, patterning of a conductive pattern (graphic display abbreviation) is also performed so that each circumference polar zone (graphic display abbreviation) may connect too hastily simultaneously. Moreover, the above-mentioned resistance 13 is formed also in the condition of connecting between each input terminal electrode 40.
[0044] Furthermore, "interlayer insulation film formation" is performed. At this process, an interlayer insulation film 41 is deposited with a CVD method. Then, "contact hole formation" is performed. At this process, a contact hole 42 is formed in an interlayer insulation film 41 and an interlayer insulation film 35 with a lithography technique and an etching technique. This is for connecting the signal-line electrode 39 and the pixel electrode 43 through the channel field 32 of a pixel transistor. Finally "pixel electrode formation" is performed. At this process, sputtering performs pixel electrode formation, for example. Namely, an indium stannic-acid ghost (henceforth ITO) ITO -- the abbreviation for Indium Tin Oxide -- it is -- after depositing, the pixel electrode 43 is formed with a lithography technique and an etching technique. Subsequently, the substrate (TFT substrate) 2 which performed annealing and formed TFT44 is completed. Then, it progresses to a liquid crystal cell production process.
[0045] Next, the flow chart of drawing 11 explains the manufacture approach of a liquid crystal cell. In addition, the sign used in each above-mentioned drawing is attached and explained to main component parts.
[0046] Introduction "substrate washing" is performed, and "orientation film spreading" is performed continuously. The orientation film is applied to a desired pattern at this process. Then, "rubbing processing" is performed and orientation processing of a substrate 2 is performed. Static electricity generated especially at the time of this rubbing is large, and prevents an electrostatic discharge according to the structure of this invention.
[0047] "Wafer inspection" is conducted after that. In this wafer inspection, first, a part for a connection is cut so that below-mentioned drawing 12 may explain. And the electrical characteristics of each chips in the substrate 2 formed by above-mentioned drawing 9 and drawing 10 (for example, TFT etc.) are inspected. Next, "superposition" is performed, after removing the dust on a substrate 2 and performing spreading of a sealant, arrangement of a spacer, etc. by washing. At this process, an up-and-down substrate is piled up through the above-mentioned spacer.
[0048] Next, "it divides." This process divides the above-mentioned substrate by scribing, breaking, etc. Then, each process of usual "impregnation and closure" of liquid crystal, and "heat treatment" is performed, and the panel of a liquid crystal display is completed.
[0049] Next, process drawing of the division approach of drawing 12 explains an approach until it divides

the substrate of this invention. Here, circumference polar-zone 15 comrades of each liquid crystal display 1 which was explained, for example by above-mentioned drawing 3 explain in the example of a configuration connected by the conductive pattern 16. Therefore, the sign used by drawing 3 is given to each component part, and is explained.

[0050] As shown in (1) of drawing 12 , the conductive pattern 16 which has connected circumference polar-zone 15 comrades of a liquid crystal display 1 is cut after rubbing processing. cutting process -- a substrate 2 -- a stage (graphic display abbreviation) top -- for example, it is made to adsorb, and fixes and dicing cuts the above-mentioned conductive pattern 16. Subsequently, electric inspection of each above-mentioned liquid crystal display is conducted. Then, the substrate 2 of the above-mentioned liquid crystal display is stuck on a tape 51, full cutting is performed, and a substrate 2 is divided. Thus, a liquid crystal display panel is formed.

[0051] Or after rubbing processing, as shown in (2) of drawing 12 , a substrate 2 is stuck on a tape 52, before cutting the above-mentioned conductive pattern 16. Dicing cuts the conductive pattern 16 after that. Subsequently, after removing a substrate 2 from the above-mentioned tape 52, as the above (1) explained, the process after electric inspection is performed.

[0052] Or after cutting the conductive pattern 16 as are shown in (3) of drawing 12 , and shown above (2), where a tape 52 is attached and a tape 52 is conducted electric inspection and attached continuously, full cutting is performed, and a substrate 2 is divided. Thus, a liquid crystal display panel is formed.

[0053] Although dicing cut the conductive pattern 16 in the above-mentioned explanation, cutting, for example by scribing is also possible.

[0054] By the division approach of the above-mentioned substrate, since the conductive pattern 16 which has connected circumference polar-zone 15 comrades of the liquid crystal display 1 formed in the substrate 2 after rubbing processing is cut, circumference polar-zone 15 comrades are connected at the time of rubbing processing. For this reason, since the capacity of each circumference polar zone 15 becomes large, the static electricity resistance at the time of rubbing processing becomes high. Subsequently, since electric inspection of each liquid crystal display 1 is conducted after cutting the conductive pattern 16, electric inspection can be conducted, without being influenced [which connected circumference polar-zone 15 comrades].

[0055] Moreover, the example of a configuration to which the circumference polar zone 15 of a liquid crystal display different from each terminal 12 of the input terminal section of a liquid crystal display which was explained by above-mentioned drawing 4 is connected explains the division approach of a substrate 2. In addition, in the following explanation, the sign used by drawing 4 was given to each component part.

[0056] What is necessary is just to transpose one side of the circumference polar zone 15 shown in above-mentioned drawing 12 to a terminal with this configuration. Dicing or scribing cuts first the part to which a terminal 12 and the circumference polar zone 15 are connected, or the terminal 12 of the near after rubbing processing. Electric inspection of each liquid crystal display is conducted after that, full cutting of the substrate of a liquid crystal display is performed, and it divides into each liquid crystal display panel.

[0057] Moreover, by the division approach of this substrate, since the part to which a terminal 12 and the circumference polar zone 15 are connected after rubbing processing, or the terminal 12 of that near is cut, a terminal 12 is maintained at this potential by the circumference polar zone 15 at the time of rubbing processing. Therefore, the static electricity resistance at the time of rubbing processing becomes high. Subsequently, since electric inspection of each liquid crystal display is conducted after cutting the above-mentioned part which makes connection, or the terminal 12 of the near, electric inspection can be conducted, without being influenced [which connected a terminal 12 and the circumference polar zone 15].

[0058] Next, while circumference polar-zone 15 comrades of each liquid crystal display which was

explained by above-mentioned drawing 7 are connected by the conductive pattern 16, the example of a configuration to which the circumference polar zone 15 of a liquid crystal display different from each terminal 12 of the input terminal section of each liquid crystal display is connected explains. In addition, in the following explanation, the sign used by drawing 7 R> 7 was given to each component part.

[0059] In this example of a configuration, the same with above-mentioned having given explanation, after rubbing processing, while cutting the conductive pattern 16 which connected circumference polar-zone 15 comrades, each terminal 12 of the part to which each terminal 12 and the circumference polar zone 15 are connected, or its near is cut. Electric inspection of each liquid crystal display is conducted after that, full cutting of the substrate of a liquid crystal display is performed, and it divides into each liquid crystal display panel.

[0060] By this division approach, since circumference polar-zone 15 comrades are connected at the time of rubbing processing, it becomes same greatly describing above the capacity of the circumference polar zone 15. Moreover, each terminal 12 is maintained at this potential by the circumference polar zone 15 at the time of rubbing processing. Therefore, the static electricity resistance at the time of rubbing processing becomes high. Subsequently, electric inspection can be conducted, without [since electric inspection of after each liquid crystal display is conducted after cutting each terminal 12 of the part by which connection is made / above-mentioned /, or its near, while cutting the conductive pattern 16, without it is influenced / which connected circumference polar-zone 15 comrades / and] being influenced [which connected each terminal 12 and the circumference polar zone 15].

[0061]

[Effect of the Invention] As mentioned above, since between each terminal of the input terminal section was connected by the resistance which has the resistance within the limits of 0.5 M omega - 5 M omega according to the liquid crystal display of this invention as explained, a component can be protected from static electricity generated for each terminal. Moreover, the static electricity resistance is securable also in the condition of having become a liquid crystal display panel.

[0062] Since between each terminal of the input terminal section of each liquid crystal display was connected by the resistance which has the resistance within the limits of 0.5 M omega - 5 M omega according to the substrate of the liquid crystal display of this invention, a component can be protected from static electricity generated for each terminal. Moreover, since it will almost be in an opening-condition even if it gives the potential difference to each terminal, electric inspection of a liquid crystal display is attained in the condition of having formed in the substrate.

[0063] Since the conductive pattern which connects the circumference polar zone of a liquid crystal display was prepared according to the substrate of the liquid crystal display of this invention, the capacity of the circumference polar zone becomes large substantially. For this reason, the static electricity resistance can be raised.

[0064] According to the substrate of the liquid crystal display of this invention, since the circumference polar zone of a liquid crystal display different from each terminal of the input terminal section of a liquid crystal display was connected, before cutting the electrode connection of each liquid crystal display, each terminal of each liquid crystal display can be maintained at this potential. Therefore, the static electricity resistance of each liquid crystal display can be raised.

[0065] According to the division approach of the substrate of this invention, since the conductive pattern which has connected circumference polar zone after rubbing processing is cut, the circumference polar zone is connected to other circumference polar zone at the time of rubbing processing. For this reason, since the capacity of the circumference polar zone becomes large, the static electricity resistance at the time of rubbing processing can be raised. Subsequently, since electric inspection of each liquid crystal display is conducted after cutting a conductive pattern, electric inspection can be conducted, without being influenced [which connected the circumference polar zone and other circumference polar zone].

[0066] According to the division approach of the substrate of this invention, since each terminal of the

part which connects each terminal and the circumference polar zone after rubbing processing, or its near is cut, each terminal can be maintained at this potential at the time of rubbing processing. Therefore, the static electricity resistance at the time of rubbing processing can be raised. Subsequently, since electric inspection of each liquid crystal display is conducted after cutting each terminal of the above-mentioned part which makes connection, or its near, electric inspection can be conducted, without being influenced [which connected each terminal and the circumference polar zone].

[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the important section block diagram of the example concerning the liquid crystal display of this invention.
[Drawing 2] It is the important section block diagram of the example concerning the substrate of the liquid crystal display of this invention.
[Drawing 3] It is the important section block diagram of the example concerning the substrate of the liquid crystal display of this invention.
[Drawing 4] It is the important section block diagram of the example concerning the substrate of the liquid crystal display of this invention.
[Drawing 5] It is the important section block diagram of other examples concerning a substrate.
[Drawing 6] It is the important section block diagram of other examples concerning a substrate.
[Drawing 7] It is the important section block diagram of other examples concerning a substrate.
[Drawing 8] It is the important section block diagram of other examples concerning a substrate.
[Drawing 9] It is the flow chart of the formation approach of a TFT substrate.
[Drawing 10] It is production process drawing of a TFT substrate.
[Drawing 11] It is the flow chart of the manufacture approach of a liquid crystal cell.
[Drawing 12] It is process drawing of the division approach of the substrate of this invention.
[Description of Notations]
1 Liquid Crystal Display
2 Substrate
11 Input Terminal Section
12 Terminal
13 Resistance
15 Circumference Polar Zone
16 Conductive Pattern

[Translation done.]